ATTACHMENT

Remarks

In the *Claim Rejections - 35 USC § 102* section of the Detailed Action, independent claims 1 and 2 as well as respective dependent claims 3 and 4 were rejected under 35 USC § 102 as being anticipated by the "Ellipse" print out. However, for the following reasons, it is submitted that these claims are allowable over this reference.

In the Action, the examiner has indicated that the "Ellipse" print out was cited in view of the discussion on page 4 which is for "Drawing a Five-Centered Arch" according to the steps described and illustrated (the other methods described on page 4 are not applicable, and hence are not discussed further). However, it will be appreciated that this disclosure does not produce the desired result, much less anticipate or make obvious the present invention for the following reasons.

Initially, it will be noted that drawing a figure in accordance with the instructions provided by the "Ellipse" print out for the "Drawing a Five-Centered Arch" is impossible (and hence teaches nothing of use). For ease of illustration, numbers will be given to the steps described for "Drawing a Five-Centered Arch", and reference will be made first to Figure E1 which is provided on separate page 9 hereafter. Thus, the disclosed steps in the "Ellipse" print out for "Drawing a Five-Centered Arch" are:

(1) Start with the box (quadrant) AFDO, whose width equal to the half the span of the major axis and whose height is equal to half of the rise of the minor axis.

(2) Draw line AD.

(3) From F, draw a line perpendicular line to line AD, which line intersects the minor axis at H (and hence forms line FH).

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(4) Make line OK equal in length to line OD.
(5) Draw a circle using line AK as the diameter.
(6) Mark off line OM equal to LD.
(7) Draw an arc having center H and radius equal to HM.
(8) From point A, mark off line AQ equal to line OL.
(9) Make line AP equal to half of AQ.
(10) Note that point P should be on line FH.
(11) Draw an arc with the center P and radius equal to line PQ.
(12) Mark point N as the intersection of the above arc about point P with the arc about point H with radius HM (step 7).
(13) Points P, N and H are then the centers of the arcs defining one-quarter of the approximate ellipse.

Now, using the above steps of the "Ellipse" print out, a figure will actually be drawn. As the examiner has indicated in the rejection that this is the "created" data, it will be appreciated that every approximate ellipse using an arc can be generally drawn; and hence a figure is first drawn with a short axis being determined to have a length 1 and a long axis being determined to have a length 2 (twice that of the short axis) for convenience of illustration. This is illustrated in Figure E2 which follows on page 10. It will be understood that by actually drawing this figure, it is being shown that in step (10) where point P should be on line FH cannot be achieved.

With reference then to Figure E2, it will be understood that an extension of the short axis OD is a y-axis, and an extension of the long axis OA is an x-axis. Thus, with OD = 1 and OA = 2, OD/OA = 1/2; so that the coordinates are A (-2, 0), F (-2, 1), D (0, 1) and O (0, 0).

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Assuming that an intersection of a straight line FH which runs through point F and intersects AD at a right angle and the x-axis is P', the slope of FH is -2 in view of the formula for the line is $y-1 = -2[x-(-2)]$.

Assuming that y=0,

then: $P'x = -1.5$

but: $Px = {-2+(-2+\sqrt{2})}/{2} = (-4 + \sqrt{2})/2 \cong 1.29293$

It will thus be seen that $P' \neq Px$, and in particular that point "P" does not exist on line FH in Figure E2 as required by the "Ellipse" print out to produce the desired ellipse (and as needed to anticipate the relevant step of claims 1 and 2).

Now, it will also be determined that point P does not exist on line FH by use of a figure.

Since it is an ellipse being drawn, a short axis and a long axis are determined or given. Assuming that the short axis is equal to 1 and the long axis is equal to Γ, a shape of the ellipse is determined by the ratio of $1:\Gamma$.

In order that point P may exist on line FH, a value of Γ must be determined. Whether such a value of Γ exists will be solved by using an expression seen in Figure E3 on page 11 hereafter. Thus, from the preceding, it is evident that OD=1, OA=Γ, and OD:OA = $1:\Gamma$. Then, based on Figure E3, it is seen that $P \neq P'$. Therefore, step (10) where "P should be on the line FH" is not attained and the present invention not taught.

In view of the above, the drawing figure mentioned in the "Ellipse" print out can not be achieved. This is also mathematically shown by the following.

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Assuming that C is a center of an arc having a diameter AK (note: γ is the same as Γ for this analysis),

if C is at (Cx, Cy), $Cx = [1+(-\gamma)]/2 = (1-\gamma)/2$

the radius $CK = 1-[(1-\gamma)/2] = (2-1+\gamma)/2 = (1+\gamma)/2 = r$

then the ellipse is defined by: $\{x-[(1-\gamma)/2]\}^2 + y^2 = [(1+\gamma)/2]^2$

Assuming that x=0,

$y^2 = [(1+\gamma)/2]^2 - [(1-\gamma)/2]^2 = [(1+\gamma)/2 - (1-\gamma)/2][\,[(1+\gamma)/2 + (1-\gamma)/2]$

$= (2\gamma/2)(2/2) = \gamma$

so that $y = \pm\sqrt{\gamma}$

Based on Figure E3, since y>0, then $y = \sqrt{\gamma}$.

Based on OL = AQ, the x coordinate of point Q is expressed as follows:

$Qx = -\gamma + \sqrt{\gamma}$,

so that: $P = (OQ + QA)/2 = [-\gamma + (-\gamma + \sqrt{\gamma})]/2 = (-2\gamma + \sqrt{\gamma})/2$

and the coordinate of P is $\left(\dfrac{-2\gamma+\sqrt{\gamma}}{2}\ ,\ 0\right)$.

Now, an intersection of FH and the x axis is determined as P'.

In the straight line FH, since a slope OD/AO of AD is $1/\gamma$, the slope of FH is $-\gamma$.

Assuming that the straight line FH runs through F $(-\gamma, 1)$ as it must,

$(y-1) = -\gamma\,[x-(-\gamma)]$.

Assuming that y=0, then it follows: $0-1 = -\gamma\,(x+\gamma)$,

or $-1 = -\gamma x-\gamma^2$

or $\gamma x=1-\gamma^2$

so $x = (1-\gamma^2)/\gamma$

A coordinate of P' is P' $\left(\frac{1-\gamma^2}{\lambda}\ ,\ 0\right)$.

Since P exists on FH, as defined above

then, $(-2\gamma + \sqrt{\gamma})/\gamma = (1-\gamma^2)/\gamma$

or $-2\gamma^2 = \gamma\sqrt{\gamma} = 2-2\gamma^2$

so, $\gamma\sqrt{\gamma} = 2$

In order that the above expressions may be achieved, with $1<\gamma<2$, γ is an irrational number (because $\gamma=1$ is a circle but not an ellipse).

If γ is an irrational number, a ratio of OD:OA cannot be determined, and hence P≠P' is achieved.

Therefore, again it is shown that the ellipse to be obtained cannot be drawn in accordance with the steps outlined by the "Ellipse" print out. And in particular, step (10) can not be accomplished.

Having established that step (10) is not correct, it then seems necessary for a complete analysis to explain how the ellipse shown in the "Ellipse" print out using step (10) is seemingly achieved.

In the method of the "Ellipse" print out, it is based on $\gamma\sqrt{\gamma} = 2$, then an $\gamma \approx 1.59$ is derived (as noted above).

However, when $1:\gamma = 1:1.59$ is determined as $1:\gamma - 1:1.6$ and this is drawn, the above-described Fig. E1 is obtained with:

$$P = (-2\gamma + \sqrt{\gamma})/2 = (-2\times1.6 + \sqrt{1.6})/2 = (-3.2+1.264)/2 = 0.968$$

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and

$P' = (1-\gamma^2)/\gamma = (1-1.6^2)/1.6 = -0.975$

or Px = -0.968, P'x = -0.975

In this expression, since P and P' are numerical characters (have values) which are relatively close to each other, it seems that these values match with each other in the drawings as illustrated in Figure E1 even though this is not true as shown.

Further, since $\sqrt{\gamma}$ is an irrational number, there is no point P under step (10) where "P should be on line FH". Thus, as P≠P', while P may approximate FH, P does not exist on FH as stated – nor meet the limitations of claim 1 and 2 in this regard.

It will additionally be noted that in step (13) as noted above, there is a description that "P, N and H are the centers of the arcs defining one-quarter of the approximate ellipse". However, if there is a case where N does not exist in P, N and H, this drawing method is thus not achievable/correct and its teaching is a nullity to those of ordinary skill.

Thus, as a further illustration, a figure will be drawn based on OD:OA = 1:4. As can be understood for Figure E4 provided herewith on page 12, a circle having a radius PQ with P at the center and a circle having a radius HM with H at the center does not have an intersection N since:

Q' is an intersection of a straight line PH and a circle having a radius AP with P at the center, and

M' is an intersection of a straight line PH and a circle having a radius HM with H at the center.

Thus, PH>PQ' + HM'

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Since there is the case where N does not exist as described above, the drawing method of the "Ellipse" print out again is shown not have meaning or be a teaching of anything useful. Again, in the method of drawing a figure based on Figure E1 of the "Ellipse" print out, the drawing conditions such as OD=OD, AK=diameter, OL=AQ do not have any meaning in order to approximately draw an elliptic by using an arc.

Thus, with reference to the present invention which is effective to draw an elliptical quadrant, the concept is embodied by the general mathematical expression at pages 8-9 thereof. In accordance with that disclosed method, it is possible to freely and easily design an ellipse which is close to a circle as well as an ellipse which is close to a flat shape. Further, increasing a value of "n" enables approximation to a further true ellipse using an arc.

Therefore, since the drawing method of the present invention can be represented by a mathematical expression, this method can be accurately used in a design as taught. This is not true, however, of the method taught in the "Ellipse" print out as noted above and which is not based on a mathematical expression or principal, so that it is not able to accurately represent an ellipse.

In particular, the "Ellipse" print out does not teach a method where the drawing of a third or further arc is made using a preceding line segment as claimed. Rather, the approximation which is used is satisfactory as only an approximation. In addition, the approximate method of the "Ellipse" print out is limited to the three arcs so drawn, while the present invention can accommodate any number of arcs as desired and claimed additionally in claim 1.

The remaining references which were cited but not applied have been reviewed but are not believed to be pertinent to the patentability of the present invention.

For all of the foregoing reasons, it is submitted that the present application is in condition for allowance and such action is solicited.

[The following pages are Figures E1 to E4 referred to above – they are not part of the application.]

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FIGURE E1

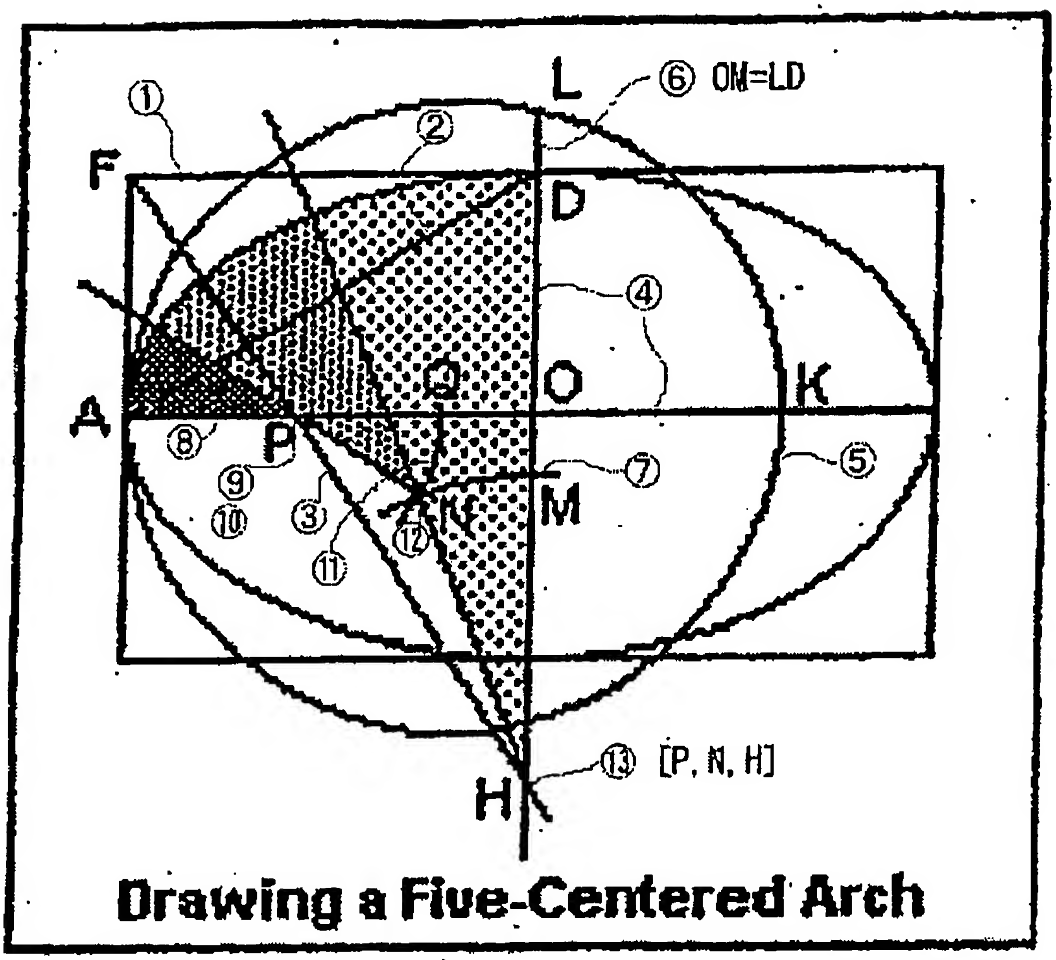

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FIGURE E2

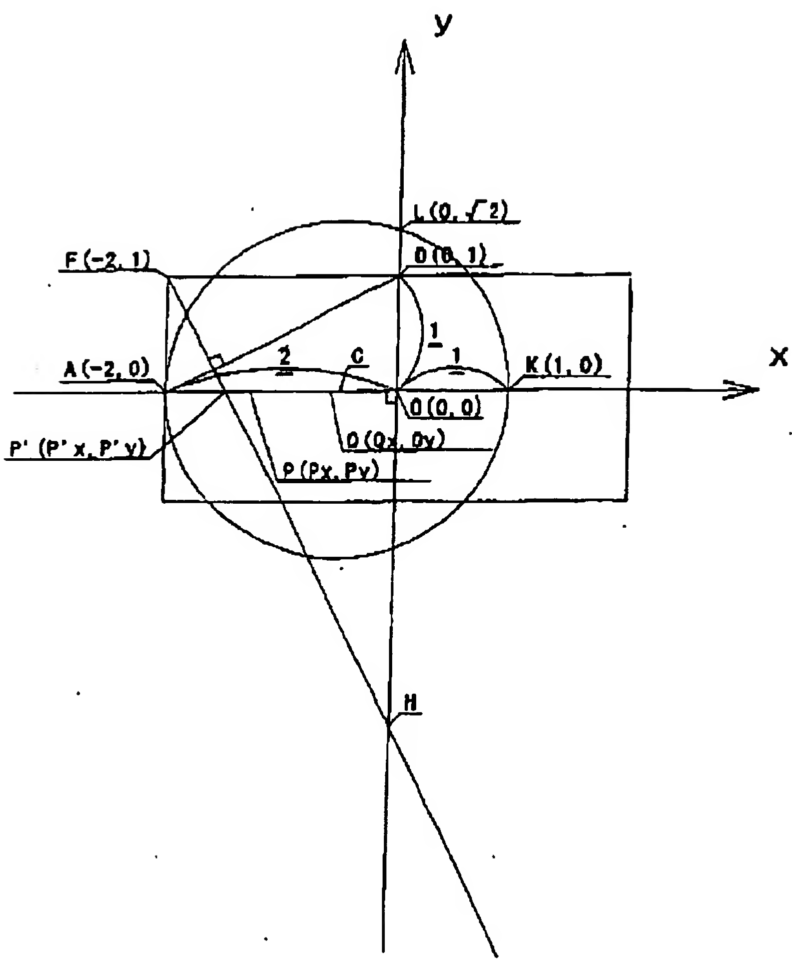

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FIGURE E3

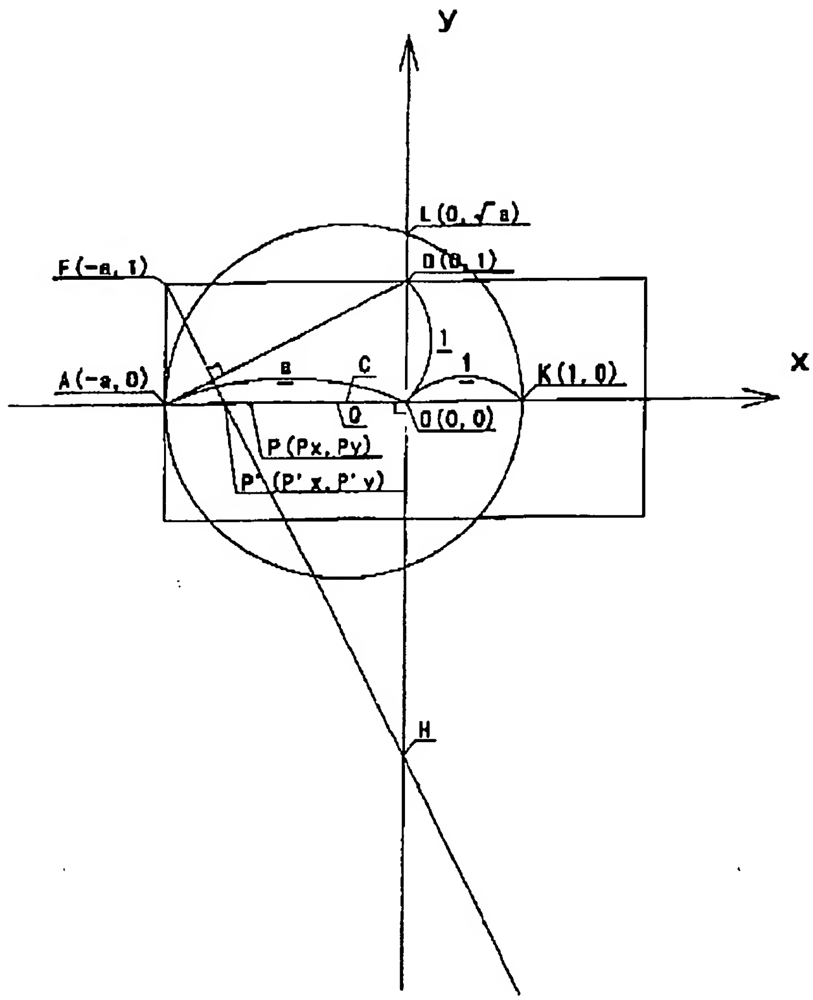

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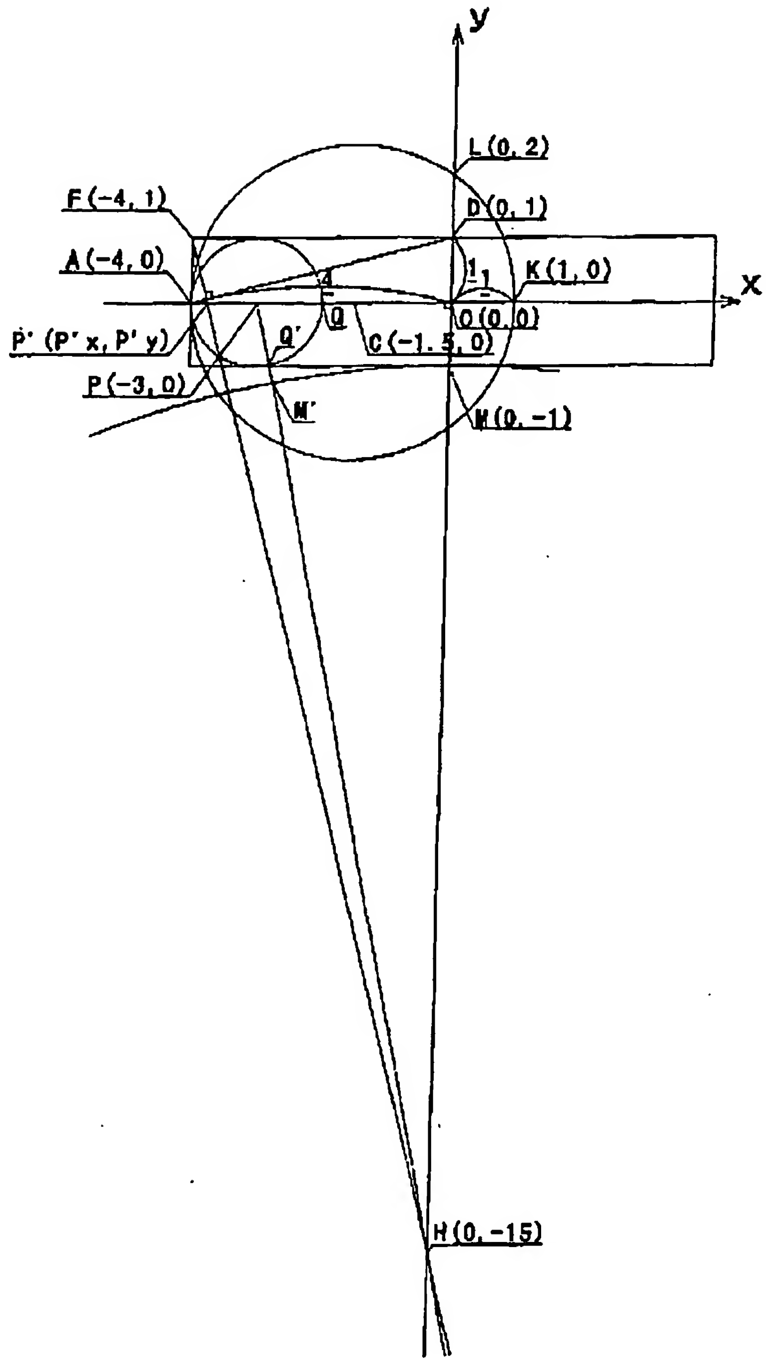
FIGURE E4



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